Effects of in-hospital diuretic therapy on electrolytes concentration, renal function and survival in 85 dogs with acute congestive heart failure

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Critically hill patients with acute congestive heart failure (CHF) may often show haemoconcentration, dysnatremia, dyskalemia and increased azotemia, due to aggressive diuretic therapy. Haemocon-centration is associated with lower risk of mortality, while dysnatremia and dyskalemia are associated with higher mortality in human medicine. The aim of this study was to retrospectively evaluate the impact of in-hospital diuretic therapy for CHF on selected laboratory parameters and long-term mortality. Dogs with clinical and radiological evidence of CHF confirmed by echocardiography were included. Blood samples collected through out the hospitalization at presentation (T0) and discharge (T1) were: venous blood gas analysis (VBGA), serum creatinine (sCr), blood ureanitrogen (BUN), microhematocrit (Htc) and total proteins (TP). Length of hospital stay, ACVIM class and other clinical indices were recorded. Haemoconcentration was defined as a simultaneous increase in Htc and total protein. A total of 85 dogs (45 male and 40 female; mean age 11.07 ± 2.54 years; mean weight 8.86 ± 6.92 kg) were included. Thirty-six dogshad previous episodes of CHF. Mean length of in-hospital stay was 31.15 ± 17.35 hours. Treatment protocol included a single furosemide endovenous bolus at 2 mg/kg followed by multiple 1 mg/kg bolus/hour until respiratory rate reach 40 respiratory rate. Each dog received 8.6 ± 2.8 mg/kg and 11.1 ± 2.9 mg/kg furosemide in 24 and 48 hours respectively. Ten dogs received higher furosemide doses or torasemide bolus. Haemoconcentration was reached in the 33% of dogs. Considering the VBGA and biochemistry results, the number of dogs showing extra-range values (T0-T1) were respectively: hyponatremia (10-23), hypernatremia (13-17), hypokalemia (18-30), hyperkalemia (10-10), hypocloremia (46-61), increased BUN (26-34), increased sCr (3-8). Fourty-one dogs experienced cardiac death, 12 during hospitalization, the remaining dogs between 3 and 721 days after admission. Stepwise backward regression demonstrated haemoconcentration (HR 0.33) and disnatremia (HR 2.85) influence over outcome. Statisti-cally significant correlation (Pearson) was seen between furosemide dose and kalemia ($r = -0.32$, $P = 0.014$) and between BUN and sCr ($r = 0.27$, $P = 0.021$). No correlation was seen between furosemide dose and the variables sCr, BUN, Htc and between sCr and Htc. In conclusion, haemoconcentration and disnatremia affected the out-come in dogs with CHF. Haemoconcentration was associated withlower risk of mortality and had to be considered a target in CHF therapy. In-hospital diuretic therapy increased electrolyte disorder due to loop diuretics inhibition of the renal Na, K, Cl cotransporter in the Henle's loop and disnatremia was a risk factor for adverse outcome. Diuretics doses and haemoconcentration didn't play a direct role in inducing renal disfunction.